

6.3.1 IMPACTS OF THE NEVADA MOSTLY LEGAL-WEIGHT TRUCK TRANSPORTATION SCENARIO

Legal-weight truck shipments in Nevada of spent nuclear fuel and high-level radioactive waste to the Yucca Mountain site would use existing highways (see Figure 6-13) and would be a very small fraction of the total traffic [less than 600,000 kilometers (370,000 miles) per year for legal-weight truck shipments in Nevada in comparison to an estimated 1.2 billion kilometers (750 million miles) per year of commercial vehicle traffic on I-15 and U.S. Highway 95 in southern Nevada]. As a consequence, impacts to land use; hydrology; biological resources; cultural resources; socioeconomics; noise and vibration; aesthetics; utilities, energy, and materials; and waste management would not be large.

Because of a U.S. Fish and Wildlife Service concern about populations of desert tortoises and Clark County concern about air quality in the Las Vegas air basin, this section addresses the potential for impacts to this threatened species and to the quality of air in the basin. This section focuses on impacts to occupational and public health and safety in Nevada. Section 6.3.4 contains a consolidated discussion of the potential for transportation activities to cause environmental justice concerns.

6.3.1.1 Impacts to Air Quality

DOE conducted a conformity review using the guidance in DIRS 155566-DOE (2000, all) for the transportation activities of the mostly legal-weight truck scenario. The Las Vegas air basin is in nonattainment status for carbon monoxide, which is largely a result of vehicle emissions (DIRS 156706-Clark County 2000, Appendix A, Table 1-3). The review determined that during repository-related operations, when maximum emissions would occur, the transportation of employees, materials, and supplies, and the transportation of spent nuclear fuel and high-level radioactive waste would not exceed the General Conformity threshold levels for carbon monoxide. Total emissions would be 63 metric tons (69 tons) per year (69 percent of the threshold) and 0.25 metric ton (0.28 ton) per day (0.07 percent of the 2000 daily carbon-monoxide levels in the Las Vegas air basin) (DIRS 156706-Clark County 2000, Appendix A, Table 1-3).

The DIRS 155112-Berger (2000, p. 55) estimate for transportation of radioactive materials only for the legal-weight truck transport for 2010 is 0.27 metric ton (0.03 ton) per day. This estimate includes traffic congestion emissions. Although DOE believes the estimate is high, a value of 0.03 ton per day, 5 days per week, 50 weeks per year, would result in about 6.8 metric tons (7.5 tons) of carbon monoxide per year, which is less than 10 percent of the threshold.

6.3.1.2 Impacts to Biological Resources

Legal-weight truck shipments in Nevada to a Yucca Mountain Repository would involve travel over highways that cross desert tortoise habitat, but none of the routes would cross habitat that the U.S. Fish and Wildlife Service has designated as critical for the recovery of this threatened species (50 CFR 17.95). Over the course of 24 years of operations under the Proposed Action and 53,000 shipments, vehicles probably would kill individual desert tortoises. However, under this scenario legal-weight trucks would contribute only about 1 percent to the daily traffic of vehicles to and from the repository site and only about 0.15 percent of all commercial truck traffic along I-15 and U.S. 95 in southern Nevada. Thus, any desert tortoises killed by trucks transporting spent nuclear fuel or high-level radioactive waste probably would be only a small fraction of all desert tortoises killed on highways. Loss of individual desert tortoises due to legal-weight truck shipments would not be a large threat to the conservation of this species. DOE is engaged in consultation with the U.S. Fish and Wildlife Service to ensure protection of desert tortoises and other biological resources.

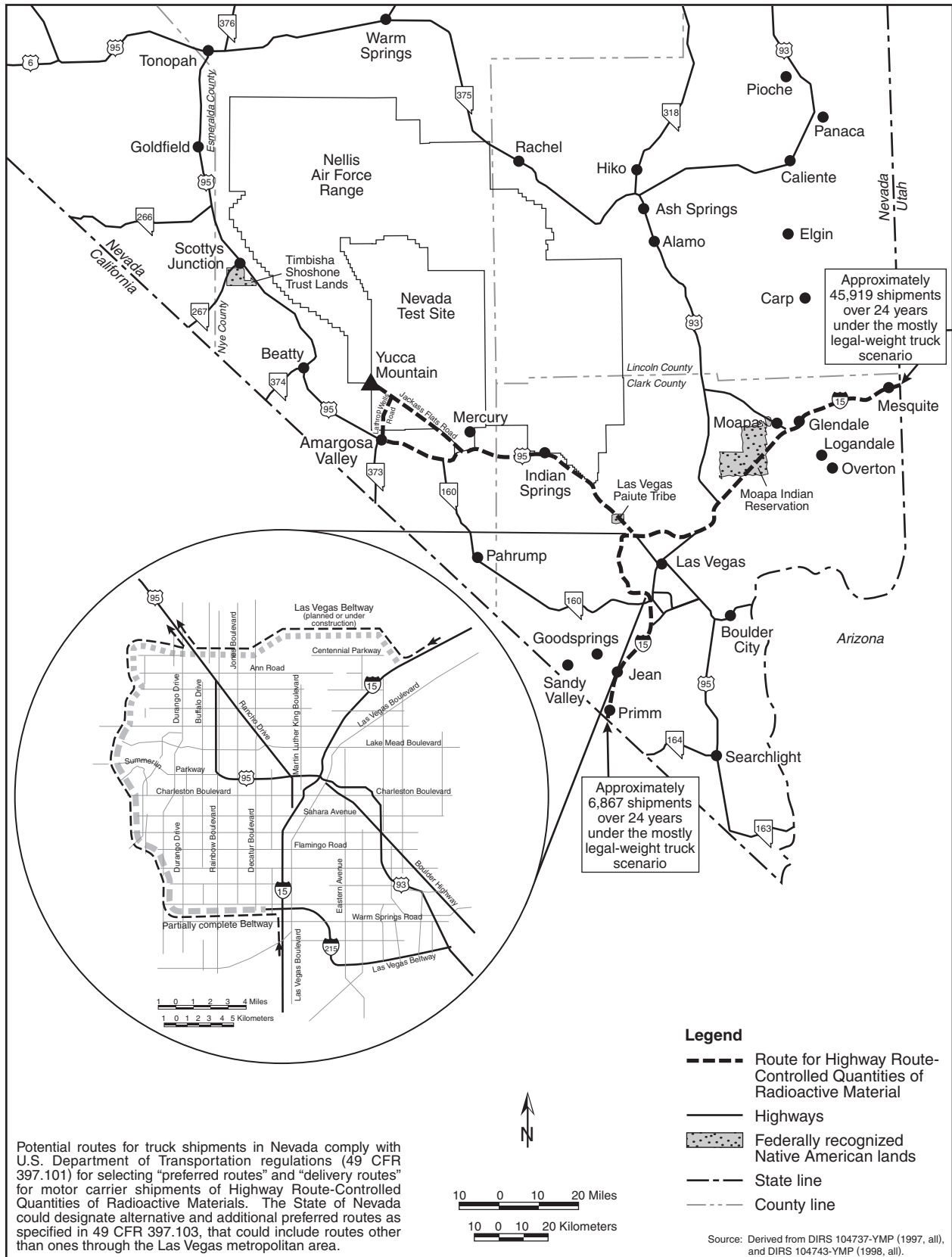


Figure 6-13. Potential Nevada routes for legal-weight trucks and estimated number of shipments.

6.3.1.3 Impacts to Occupational and Public Health and Safety

6.3.1.3.1 Impacts from Incident-Free Transportation

This section addresses radiological impacts to populations and maximally exposed individuals in Nevada from the incident-free transportation of spent nuclear fuel and high-level radioactive waste for the mostly legal-weight truck scenario. It includes potential impacts from exposure to vehicle emissions in Nevada.

Incident-Free Radiological Impacts to Populations. Table 6-18 lists the incident-free population dose and radiological impacts for the Nevada mostly legal-weight truck scenario. The impacts include those from the shipment of naval spent nuclear fuel by rail in Nevada to an intermodal transfer station, heavy-haul transfer activities, and subsequent heavy-haul truck transportation to the proposed repository. The analysis included the radiological impacts of intermodal transfer operations for naval spent nuclear fuel shipments. Occupational impacts would include estimated radiological exposures to security escorts for legal-weight truck, rail, and heavy-haul truck shipments. The estimated radiological impacts would be 0.75 latent cancer fatality for workers and 0.18 latent cancer fatality for members of the public over the 24 years of operation.

Table 6-18. Population doses and radiological health impacts from incident-free transportation for Nevada mostly legal-weight truck scenario.^a

Category	Legal-weight truck shipments	Rail shipments of naval spent nuclear fuel ^b	Totals ^c
<i>Involved workers</i>			
Collective dose (person-rem)	1,900	18	1,900
Estimated LCFs ^d	0.75	0.01	0.75
<i>Public</i>			
Collective dose (person-rem)	340	10	350
Estimated LCFs	0.17	0.005	0.18

a. Impacts are totals for shipments over 24 years.

b. Includes impacts at intermodal transfer stations.

c. Totals might differ from sums of values due to rounding.

d. LCF = latent cancer fatality.

DOE based estimated impacts of legal-weight truck shipments in Nevada on routes identified for analysis in accordance with requirements in U.S. Department of Transportation regulations (49 CFR 397.101). As required by those regulations, and because the Las Vegas Beltway will be part of the Interstate Highway System, DOE assumed its use to avoid travel through the heavily traveled center of Las Vegas. In addition, DOE analyzed the potential impacts of using other routes that the State of Nevada has studied and of routing shipments through the Interstate 15-U.S. 95 interchange (the “*Spaghetti Bowl*”). Appendix J, Section J.3.1.3 discusses the results of these analyses, which range from 83 to 490 person-rem (0.04 to 0.25 latent cancer fatality in the affected population) for Nevada populations.

Incident-Free Radiological Impacts to Maximally Exposed Individuals. Table 6-19 lists estimates of dose and radiological impacts for maximally exposed individuals for the Nevada legal-weight truck scenario from 24 years of shipment activity. The analysis used the assumptions presented in Section 6.2.1 and Appendix J.

The analysis assumed the annual dose to state inspectors who conducted frequent inspections of shipments of spent nuclear fuel and high-level radioactive waste would be limited to 2 rem.

The analysis estimated that a maximally exposed individual at a service station would receive 2.4 person-rem over 24 years under the legal-weight truck scenario. This estimate conservatively assumed the person would be exposed to 450 truck shipments each year for 24 years. For perspective, under the mostly legal-weight truck scenario, which assumes an average of 2,200 legal-weight truck shipments per

Table 6-19. Estimated doses and radiological health impacts to maximally exposed individuals during incident-free transportation for Nevada mostly legal-weight truck scenario.^{a,b}

Individual	Dose (rem)	Probability of latent fatal cancer
<i>Involved workers</i>		
Crew member	48 ^c	0.02
Inspector	48 ^c	0.02
Railyard crew member	0.13	0.00005
<i>Public</i>		
Resident along route ^d	0.02	0.00001
Person in traffic jam ^e	0.016	0.000008
Person at service station ^f	2.4	0.0012
Resident near rail stop	0.009	0.000005

a. The assumed external dose rate is 10 millirem per hour at 2 meters (6.6 feet) from the vehicle for all shipments.

b. Impacts are totals over 24 years.

c. Based on 2-rem-per-year dose limit (DIRS 156764-DOE 1999, Article 211).

d. This represents a Nevada resident approximately 11 meters (36 feet) from the highway. See Appendix J, Section J.1.3.2.2.

e. Person in a traffic is assumed to be exposed one time only.

f. Assumes the person works at the service station for all 24 years of repository operations. Mitigation would be required to reduce doses to members of the public to less than 100 millirem per year.

year, about 450 truck shipments would pass through the Mercury, Nevada, gate to the Nevada Test Site in 1,800 hours. A worker at a truck stop along the route to Mercury would work about 1,800 hours per year. Thus, if every shipment stopped at that truck stop, the maximum number of shipments the worker would be exposed to in a year would be 450. Appendix J, Section J.1.3.2.2, describes assumptions for estimating doses to maximally exposed individuals along routes in Nevada.

Impacts from Vehicle Emissions. There is potential for human health impacts to people in Nevada who would be exposed to pollutants emitted from vehicles transporting spent nuclear fuel and high-level radioactive waste, including escort vehicles. Table 6-20 lists the estimated number of vehicle emission-related fatalities from legal-weight trucks, a small number of heavy-haul trucks carrying naval spent nuclear fuel, escort vehicles, and rail locomotives under the mostly legal-weight truck scenario. Trucks would be the major contributors. Less than 1 (0.093) vehicle emission-related fatality would be likely.

Table 6-20. Population health impacts from vehicle emissions during incident-free transportation for Nevada mostly legal-weight truck scenario.^a

Category	Legal-weight truck shipments	Rail shipments of naval spent nuclear fuel ^b	Total
Vehicle emission-related fatalities	0.086	0.0069	0.093

a. Impacts are totals for shipments over 24 years.

b. Includes heavy-haul truck shipments in Nevada.

6.3.1.3.2 Impacts from Accidents – Nevada Legal-Weight Truck Scenario

This section discusses radiological impacts to populations and maximally exposed individuals in Nevada and the potential number of traffic accident fatalities from accidents during the transportation of spent nuclear fuel and high-level radioactive waste for the mostly legal-weight truck scenario. The analysis of accident impacts under this scenario includes impacts from accidents that would occur during the transportation of naval spent nuclear fuel by rail in Nevada to an intermodal transfer station and by heavy-haul truck to the repository. Section 6.3.3 discusses impacts to workers from industrial hazards during the operation of an intermodal transfer station for shipments of naval spent nuclear fuel.

Radiological Impacts from Accidents. The calculated collective radiological dose risk of accidents would be approximately 0.053 person-rem for the population in Nevada within 80 kilometers (50 miles) along the routes under the mostly legal-weight truck transportation scenario. This calculated dose risk

would be the total for 24 years of shipment operations. The radiological dose risk of accidents is the sum of the products of the probabilities (dimensionless) and consequences (in person-rem) of all potential transportation accidents. A radiological dose risk of 0.05 person-rem would result in much less than 1 (0.000026) latent cancer fatality in the exposed population. The radiological risk from accidents would include impacts from approximately 53,000 legal-weight truck shipments and 300 naval spent nuclear fuel rail shipments. The accident risk for legal-weight truck shipments would account for essentially all of the population dose and radiological impacts. Because DOE would not build a branch rail line to the repository under this scenario, the accident risk for rail shipments of naval spent nuclear fuel includes risks from accidents that could occur during intermodal transfers from railcars to heavy-haul trucks and during heavy-haul transportation in Nevada. Section 6.3.3 provides additional information on heavy-haul truck implementing alternatives for transporting rail casks in Nevada.

Consequences of Maximum Reasonably Foreseeable Accident Scenarios. The analysis evaluated the impacts of a maximum reasonably foreseeable accident scenario presented in Section 6.2.4.2.

Impacts from Traffic Accidents. In Nevada, less than 1 (0.49) fatality from traffic accidents would be likely during the course of transporting spent nuclear fuel and high-level radioactive waste under the mostly legal-weight truck transportation scenario. This estimate includes traffic fatalities involving escort vehicles.

6.3.2 IMPACTS OF NEVADA RAIL TRANSPORTATION IMPLEMENTING ALTERNATIVES

This section describes the analysis of human health and safety and environmental impacts for five rail transportation implementing alternatives, each of which would use a newly constructed branch rail line in Nevada to transport spent nuclear fuel and high-level radioactive waste to the repository. The branch line would transport railcars carrying large shipping casks from a mainline railroad to the repository (loaded) and back (empty). DOE has identified five 400-meter (0.25-mile)-wide corridors of land—Caliente, Carlin, Caliente-Chalk Mountain, Jean, and Valley Modified—for the possible construction and operation of the branch line (Figure 6-14). Chapter 2, Section 2.1.3.3.2 describes the corridors. Chapter 3, Section 3.2.2.1, discusses their affected environments.

Appendix J, Section J.3.1.2, contains additional information on the characteristics of possible variations of each corridor. Figure 6-14 shows these variations. Section 6.3.2.1 discusses impacts that would be common among the five possible corridors, and Section 6.3.2.2 discusses impacts that would be unique for each corridor.

DOE identified the five rail corridors through a process of screening the potential rail corridors it had studied in past years.

MAXIMUM REASONABLY FORESEEABLE ACCIDENT SCENARIOS IN NEVADA

Maximum reasonably foreseeable accident scenarios analyzed for transportation in Nevada were the same as maximum reasonably foreseeable accident scenarios analyzed in Section 6.2.4.2 for national transportation. That is, the EIS analysis assumed that an accident determined to be reasonably foreseeable for national transportation could occur in Nevada. Because the distances traveled in Nevada would be much less than the total national travel to deliver spent nuclear fuel and high-level radioactive waste to the Yucca Mountain site, the likelihoods of these accident scenarios occurring in the State would be less than those for the rest of the Nation. The likelihoods of two of these accident scenarios occurring in national travel are reported in Section 6.2.4.2.